

A Brown Setter Dog to Reveal to Science the Mysteries of the Brain.



**How Poor Doggy Will
Wear Ivory Plugs and
Electric Wires in His Skull
to Help Science Explore
the Mysteries of the Brain; the
Board Around His Neck Is to Keep
Him From Scratching at His Head.**

A BROWN setter dog may disclose all the hidden mysteries of the human brain. Experiments made upon its brain by a new method have already demonstrated the uses of some parts of that organ which had never before been explored. As the brain of an intelligent dog closely resembles that of man, the knowledge thus gained can be applied to the relief of human ills.

The dog, whose name is Jim, is the property of Professor Talbot, of La Porte, Ind., and is a willing and ready helper in his master's scientific researches. He does not look quite like other dogs, because the whole top of his head is filled with little ivory plates, from which project small silver knobs. The ivory plates are now part and parcel of the dog's skull, and give the animal no more trouble than did the bone whose place they now occupy.

In effect, the dog is a walking physiological laboratory. He represents the highest achievement in painless vivisection. He has had to endure a certain amount of discomfort in the early stages of the experiment, but he has suffered no pain whatever.

All that is known at present about the function of the different parts of the brain has been learned from experiments performed upon animals while they were under the influence of chloroform. In the beginning, a small part of the skull was removed and the brain thus exposed was stimulated with a very weak current of electricity.

It was found that when the wire was tightly placed upon one small spot on the brain, it caused the animal to move its hind leg. When the wire was placed on a spot a little higher up it caused movement in the front leg. Still another spot was found to be the centre of movement for the eyes, and so on.

In this way the whole surface of the brain was mapped out into what surgeons call "motor centres." It was found that this could be done with great exactitude, and that what was true of the brain of one animal was always true of the brain of any other animal of the same species. For instance, when the surgeons found that a touch of the electric wire upon a certain spot on the brain of a monkey caused it to move its tongue, they also found that stimulation of the same spot on the brain of any other animal of the monkey species also caused the tongue to move.

The value of this knowledge in diseases of the brain is incalculable, because it is now possible to reason from effect back to cause. Surgeons now know that a given spot on the human brain is the motor centre for the right leg. If a patient is found to be suffering with total paralysis of the right leg it is, therefore, pretty certain that there is something wrong with the piece of brain which governs that leg. Accordingly, the surgeon shaves his patient's head, cuts through the skull at the exact spot at which he knows the leg centre to be, and there finds, probably, a small abscess pressing upon the brain. When this is removed the patient can walk.

As to constant experimentation upon and to the fact that accidents expose large surfaces of the human brain, surgeons now believe that they

known all the purely "motor centres" of the human brain. There yet remains, however, a vast extent of brain territory that is entirely unexplored.

It is this unknown territory which Professor Talbot hopes to reach through the instrumentality of the brown setter dog.

At present five "centres" of the brain are specifically known to surgeons. They are the area for movements of all limbs, the talking centre, the seeing centre, the hearing centre and the centres of sensation of smell and taste.

There are, however, large areas of the covering of the brain whose use is unknown and undetermined. These seem to be much more extensive on the right side of the brain than on the left. It is a curious surgical fact that the right side of the brain governs the action of the left side of the body, and vice versa. The right limb and area are more used than the left by the average man, and so it happens that the motor centres of the left side of the brain are usually best developed and understood. The left side of the head, in the normal individual, is bigger than the right. The left side of the face, though, is usually the softer and better looking side.

Hitherto it has been almost impossible for surgeons to reach the underlying substance of the brain, and because of this fact, not overmuch interest has been taken in its uses. It has been noticed that a tumor if the base of the brain, or of any part of its core, has been so speedily fatal that there has been little time for study of the symptoms. Recently, however, a German surgeon, by one of the most daring operations on record, succeeded in successfully removing a large tumor from the base of a boy's brain, and thereby opened up an entirely new field to both the surgeon and the physiologist.

The base of the brain is practically that part lying between and a little below the ears. The quickest and most direct route to it would be from the back of the head, but that way is barred by the medulla oblongata, which is considered to be the centre of life. The way of reaching the desired spot adopted by the German surgeon was so startling that only his own assistants were allowed to be present at the first operation. Briefly, he removed and turned back, like a flap, almost the entire front of the boy's face, from the eyebrows to the lower lip, and operated upon the brain tumor through the space thus formed. The boy made a perfect recovery.

This operation, more than any other, has been what has stimulated such experiments, as Professor Talbot is trying to discover the exact uses of that portion of the brain which underlies the covering.

The usual method of studying such phenomena has been to chloroform a dog, and, while the animal was still unconscious, to experiment upon exposed surfaces of its brain with an electric battery. The objections to this procedure were that the dog was unconscious; that it could only be used once; that the stimulation of the brain was entirely artificial, and that the absence of pain and its consequent voluntary movement could not be guaranteed.

Professor Talbot, in his researches into brain surgery, had necessarily become acquainted with the fact that holes made in

the skull of either man or animal could be readily repaired, either by placing a plate of metal or ivory in the hole, or by causing the original piece of bone which had been removed from the skull to grow into its place again. It occurred to him that it might be possible to so operate upon the head of a dog as to leave the animal in condition for subsequent experiments, and, at the same time, to have the animal normal and free from pain.

Jim was therefore prepared for what was to follow by having his head shaved. This having been done he was anaesthetized and an incision was made through his scalp right across the head, just above the eyes. This cut was carried far over toward the ears, and then carried upward. The flap of skin so formed was then dissected back so as to lay bare the entire surface of that part of the skull containing the brain.

Then Professor Talbot picked up a small trephine—a surgical instrument which has a handle like a walking stick. With this instrument Professor Talbot bored a number of holes through the dog's skull exactly over the places which previous experiments upon other dogs had taught him to be the locations of motor centres. Into the holes thus formed ivory plates, which exactly fitted the spaces, were placed. Each of these ivory plates bore previously been pierced and furnished with tiny binding posts to carry battery wires.

In two instances the bits of bone removed from the dog's skull were similarly prepared for wires and were then replaced.

When every hole had been fitted either with its ivory plate or its button of bone the scalp was brought back into place, holes were cut in it to allow the little silver binding posts to come through the skin, and the wound was then sewed up and dusted with an antiseptic dressing.

If Jim had been human it would have been easy to tell him to let his wounds alone and to teach him why it would be advisable to do so. Jim, however, being a dog, had his own notions about wounds, and he wanted to treat them after the manner of his kind by vigorously scratching them. To prevent this Jim had to be fitted with a big square wooden collar, something like that put upon prisoners and called the cage by Chinese magistrates. This effectively prevented Jim from interfering with the handwork of his master.

When this had been done wires were joined to each set of binding posts projecting from the dog's head. These wires, in turn, were each connected with an electric key like those which telegraph operators use. Pressure upon any key would send a very weak current of electricity along the wire with which it was connected.

As soon as all the connections had been made Jim's master pressed down one of the keys. The dog, with a rather puzzled look upon his face, promptly stretched out his fore leg. Professor Talbot labelled that key "Front Leg" and touched another. The dog immediately sneezed vigorously.

This was an entire surprise, for a sneezing centre had been hitherto unknown. The experimenter thought the sneeze might

have been caused by some more direct irritation and so tried some other keys for a while. When he returned to the sneeze key, however, the dog sneezed just as vigorously as ever.

Another key, it was found, made the dog cough, while still another made his eyes stream with water.

Several other complicated movements resulted from touching other keys, and in nearly every case the results differed entirely from those which had been obtained when the animal experimented upon had been the subject of direct operation. The watching surgeons said that it meant that the results obtained from unconscious dogs which were possibly in inarticulate pain

were unreliable. It was shown that in the case of Professor Talbot's dog much deeper centres had been reached than any previously known.

Five minutes after the wires were removed from his head Jim was running around as cheerfully as ever, in spite of the fact that he had taught some distinguished scientists at least two new facts about brain centres.

Professor Talbot will prepare the heads of other dogs in the same way. He expects to be able to revolutionize brain surgery, at least so far as the deeper parts of the brain are concerned, as soon as the results of his experiments have been tabulated and tested.

FIG. I
SHOWING
VARIOUS
UNKNOWN
PORTIONS
OF THE BRAIN



FIG. II
SHOWING
UNKNOWN
INTERIOR
CORE OF
THE BRAIN

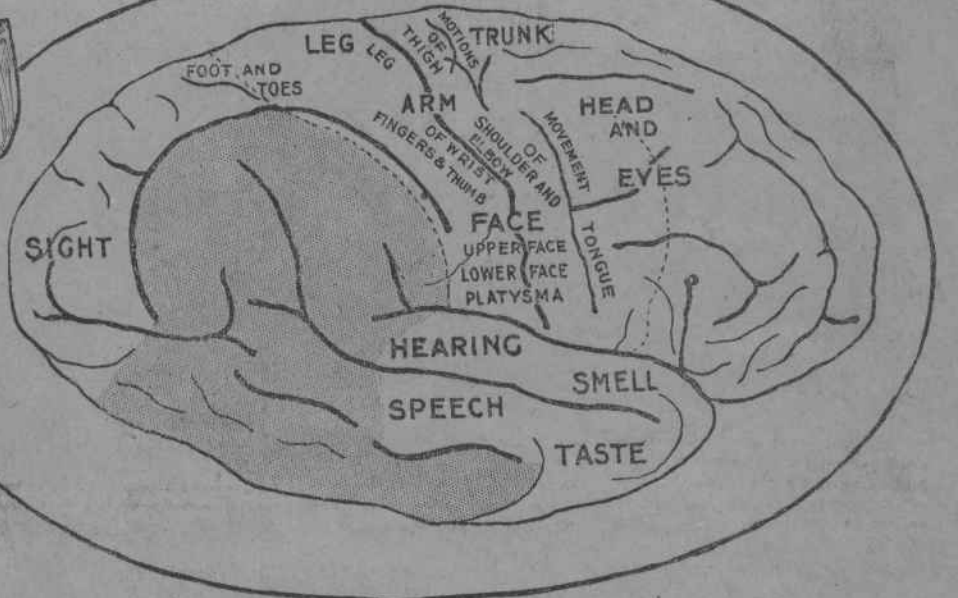
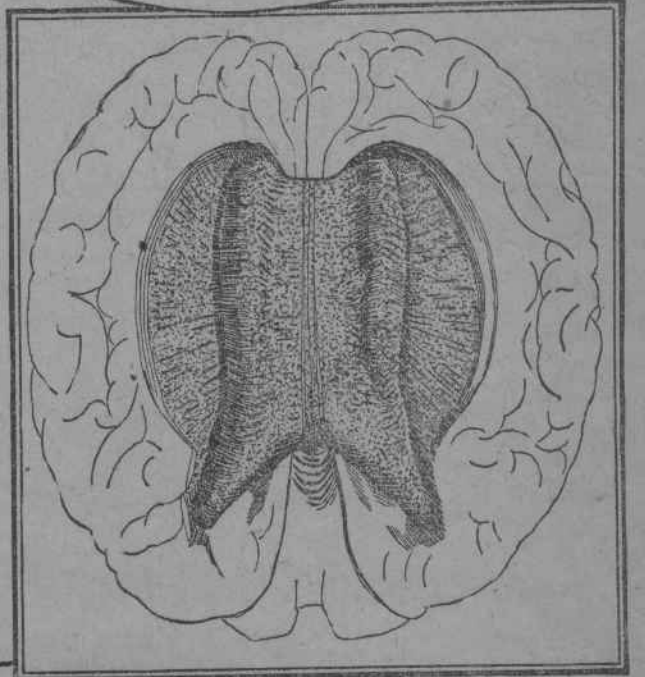


FIGURE I.—Cross section showing unexplored interior of the human brain.

(a) Nerve fibres underlying the centre of sight.
(b) Area supposed to direct complicated movements of the leg.
(c) Fibres having to do with undiscovered actions of the trunk.
(d) At present believed to influence the head and eyes.
(e) Part of the unexplored core of the brain.
(f), (g) and (h) Functions unknown.
(m) The medulla, the seat of life.

FIGURE II.—The centre of the human brain which science has been unable to reach and whose functions are unknown.

FIGURE III.—Showing the superficial area of the human brain and the known functions—the shaded portions are unknown.

FIGURE IV.—Showing superficial portions of dog's brain and such functions as science has succeeded in locating.

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A DELAWARE WHIPPING SCENE RECORDED BY THE MUTOSCOPE.



JOHN WRIGHT RECEIVING HIS TEN STROKES OF THE "CAT."

(From a photograph taken by C. Fred Ackerman, of the American Mutoscope Co.)

somewhat tardily, that he had recently made rather more trouble than was necessary for the warden, and he wondered whether the official remembered the fact.

"You'll play light, won't you, Warden?" he asked, apprehensively, as he watched the whiplapper dip the "cat" into the red paint.

"Oh, sure," said the Warden, in a tone the prisoner didn't half like. "This is just for fun."

The picture man began to turn the handle, the "cat" rose and fell.

Nine neat lines of red paint appeared upon the white skin of the prisoner's back. It was a beautiful shot, but Wright did not seem to be at all happy thereat. Instead he drew up one leg and said in a tone of intense conviction:

"Here, say, Warden, (that's no fun, let me out of this.)"

"Oh, no," said the Warden, soothingly and softly. "A bargain's a bargain, my son. And you've got the half dollar in your pocket."

The next stroke was an evidence of ability, for it crossed the first after the lozenge fashion that used to be the pride of the British Navy quartermasters, but it pleased Wright even less than the first. Only the picture man and the Warden were happy.

The rest of the ten were of the "flickering" order, but, thanks to the liberal supply of red paint, they looked like the real article. At the close of the exhibition Wright was taken down. He looked at his back. Then he produced the half dollar and inspected that. Lastly, holding the piece of silver in his hand, he went over to the picture man and looked at him. The picture man "came down" gracefully. It was a dollar and a half altogether.

To these pictures of Delawarean justice were added several others showing the prisoners marching in lock step. They will also be on exhibition at Keith's soon.

Cow's Brain Severed and Placed in a Man's Head.

THE most delicate surgical operation field a young heifer, and the brains of the animal were removed and substituted for those which were badly injured in the head. The transfer of the delicate members was tedious, but was, it is recently, at Harman, W. Va. Jay Lutz, mine boss in the Harman mines, was almost killed by falling slate, his skull in the back of his head being badly crushed. All hope of his recovery was abandoned, but Dr. Harman concluded to resort to the last means to save the man's life, and accordingly had brought in from the pasture